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ABSTRACT

Researchers have observed that academic achievement of socioeconomically disadvantaged and minority group children declines relative to norms of performance as the number of years in school increases. Less documented is the relationship of student self concept to achievement. A study underway at the University of Texas proposes to address both affective and cognitive aspects of the widening of the achievement gap. Using a sample of 1,657 sixth grade students in 53 Austin classrooms, student characteristics in four areas (self esteem, school adjustment, attitude toward school, and achievement) were cross related at the beginning of the school year. Academic standing at the end of the year was examined in relation to these characteristics. Seventy percent of the students were Anglo, 15% black, and 15% Chicano. Both ethnicity and socioeconomic status were considered in the analysis. Six measurement instruments were used. Three of these measured attitudes toward school, teacher, and life in general, one measured coping skills, one self esteem, and one academic achievement. Results show that students high in initial self esteem gained in achievement and students high in achievement gained in self esteem. Disadvantaged students are locked into the negative end of this cycle, since they start out the year at the lower end of both self esteem and achievement. (GC)

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"THE RICH GET RICHER" . . . IN SCHOOL, TOO

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In a review of the literature, Stearns (1971) found that for disadvantaged children, school achievement has been observed to decline relative to norms of performance, as the number of years in school increases. In a more recent review (Weinberg, 1977), this finding was essentially confirmed. Weinberg found a progressive widening of the gap in reading and other skills between White and minority children and Black, Spanish-speaking, and Indian children, over the twelve grades.

Stearns reported the discouraging news that even in preschool enrichment programs in which disadvantaged children's IQ and achievement test scores are improved, they are not brought up to national norms. Indeed, after the children have been in elementary school for two or three years, benefits disappear and the achievement gap widens. An evaluation report on federally funded (Title I) reading activities (Comptroller General, 1975) stated similar conclusions and actually reported rates of differential growth for educationally deprived and average (national norm) children. The educationally deprived child achieves an average of .7 of a year's academic growth for each year in class, without ongoing compensatory education. Under Title I programs, the growth rate averages .9 of a year's academic growth; this rate is not maintained when a child is taken out of such a program.

This widening of the achievement gap has been found in studies which did not consider the SES of the pupils. The 1966 Coleman Report (Coleman et. al, 1966) showed, through analyses of large amounts of national education data, that the gap in achievement level between high and low achievers widens as those students progress from first grade to graduation from high school. Coleman found

that most students in the top third of their class have been successful throughout their schooling, and he stated that those in the bottom third fail in two ways: they were always among the low achievers and they moved down as they proceeded through school.

Cross (1971) discussed findings from the Educational Testing Service Academic Growth Study that were similar to Coleman's, although based on separate data. He suggested that successful students become achievement oriented and continue to do well over the course of their schooling. The lower achievers become fearful of failure and disoriented and threatened by possible success. By age 18, he said, a self-rewarding cycle of success and academic involvement, or a cycle of failure, non-cognitive pursuits, and passivity toward schooling has been well established. In the only study of its kind that could be located, Stanwyck and Felker (1973) examined locus-of-control and found that, across grades three through six (cross-sectionally), pupils with low self-concept "gradually" assumed less responsibility for school success, while self-respecting students assumed more. Self-concept is significantly related to achievement (for a review of the literature, see West and Fish, 1973) with achievement identified as the independent or causal variable (Calsyn, 1973). With the exception of Stanwyck and Felker, evidence for the spiral must be pieced together.

The Teaching-Learning Interaction (TLI) Study, currently being conducted at the R&D Center for Teacher Education (University of Texas at Austin), provides a useful design for studying the dynamics of this widening of the achievement gap for several reasons. First, in this study, a number of different measures, both affective and cognitive, were taken on the pupils in the study of the effects of initial self-esteem on achievement gain and of initial achievement on self-esteem gain. Second, the TLI study involved a sizable sample of pupils (1,657) and classrooms (53). Finally, the classes studied are all well balanced

for ethnicity and SES. Because of a court-ordered integration ruling in Austin, Texas, a stratified random assignment of pupils to classes was made in the sixth grade learning centers where the study is underway. The general plan of the analyses reported here was first to cross-relate student characteristics in four areas (self-esteem, school adjustment, attitude towards school, and achievement) at the beginning of the year, and then to look at how students' standing on these variables affects their standing at the end of the year. SES and ethnicity were also included, to see whether the patterns found vary according to SES and ethnicity.

Method

Fifty-three classrooms in four schools were studied in this sample, (one of four such samples). One thousand, six hundred fifty seven sixth-grade students were studied. These students were racially mixed in the same proportions as the Austin community as a whole (Anglo 70%, Black 15%, Chicano 15%). The students were randomly assigned to the 53 classes.

Data were obtained from these students at the beginning of the year and at the end of the year on a number of different instruments. Six of the instruments were used in this analysis. Three instruments measured various attitudes toward school (SSI), teacher (SET), and life in general (SSC-A). One instrument was a measure of coping skill (SSC-C); one instrument was a measure of self-esteem (P-H); and finally, there was one achievement measure (CTBS).

Student Evaluation of Teaching (SET)

The Student Evaluation of Teaching (SET) instrument elicits students' evaluations of their teachers by having them indicate their degree of agreement

with descriptive items on a Likert scale. The original version of the SET was developed by D.J. Veldman and R.F. Peck at the University of Texas at Austin Research and Development Center for Teacher Education (Veldman, 1970). A slightly revised version was used in the present study.

Analysis of the data indicated that, with the exception of two items (4 and 9), the instrument measured a single underlying dimension. Thus, scores were based on the remaining eight items. Mean scores for students were derived by dividing the sum of the items answered, by the number of responses. This insured comparable scores for all students, regardless of whether or not they had responded to all eight items. Scores range in value from 1.0 to 4.0; higher scores reflect more favorable evaluation of the student's teacher.

Internal consistency reliability (Cronbach's alpha) for this instrument was .76 (pretest) and .80 (posttest). Evidence of the validity of the original instrument is given by Veldman (1970). In his study of 50 teachers, each having two classes of students, correlations across classes for the five scales constructed from that version of the SET (2 items per scale) ranged from 0.72 to 0.92.

Comprehensive Tests of Basic Skills (CTBS)

The Comprehensive Tests of Basic Skills are a series of tests designed to measure students' academic achievement in the areas of language arts, social studies, math, and science. These tests were published by CTB/McGraw-Hill in 1973. For each subject area, there are several forms of the tests, at several levels of difficulty, and procedures are available for comparing scores on different forms and at different levels of difficulty.

In the present study, students were tested either in language arts (language mechanics/ language expression) (10 classes) or social studies (41 classes). Two classes did not have achievement data because of mid-year changes. For

the pretest CTBS, Form S, Level 2 was administered. For the posttest, students received CTBS, Form S, Level 3, since many had scored near the top of the scale on the pretest, Level 2. Scoring was according to the published instructions.

The CTBS, Technical Bulletin No. 1 (1974, p. 41-42) reports both internal consistency reliability (KR-20) and interlevel correlation coefficients for each of their tests for a particular group of students. For late fifth and early sixth graders (pretest level), the Form S, Level 2 Language Arts test has a reliability of 0.82 (language mechanics) and 0.99 (language expression). The Social Studies test for this group has a reliability of 0.87. For late sixth grade (posttest level), the Form S, Level 3 Language Arts test internal consistency reliability is 0.76 for language mechanics and 0.87 for language expression. For Social Studies, this reliability is 0.89.

Student Sentence Completion (SSC A and SSC C)

The Student Sentence Completion (SSC) is an instrument used to derive students' self-ratings with regard to coping skills (SSC C) and general attitudes towards life (SSC A). It consists of a number of sentence stems from which students choose one of four alternative completions. The original version was developed by R.F. Peck, Elaine Michelis and several colleagues in the Cross-National Study of Coping Styles (Peck, et. al, Vol. V, 1973).

Analysis of the original scoring procedure for this study based on 25% of the pretest sample, indicated the need for certain revisions. One of the 29 items was dropped, and the scoring weights for the response alternatives for several items were modified. In the final form, the attitude scale (SSC A) consisted of 12 items, and the coping scale (SSC C) was made up of 14 items. Mean scores were derived, based on the total item score divided by number of responses, thus allowing comparability among students whether or not they had completed all

items. Scores range in value from 1.0 to 3.0; higher scores indicate more favorable attitude towards life and better coping skills.

The internal consistency reliability (Cronbach's alpha) for the SSC A was 0.62 (N=1044) for the pretest and 0.63 (N=1,013) for the posttest. For the SSC C the reliability was 0.66 (N=1,044) for the pretest and 0.69 (N=1,013) for the posttest. Test-retest reliability, based on a time lapse of 3 weeks, was 0.63 for the SSC A and 0.68 for the SSC C.

School Sentiment Index (SSI)

The School Sentiment Index (SSI) measures students' attitudes toward school. The original version was developed by the Instructional Objectives Exchange, UCLA Center for the Study of Evaluation (1972). It consists of 81 statements to which students express agreement or disagreement and represents five dimensions: the teacher, learning, social structure and climate, peers in school, and school in general.

Initial examination of the SSI, and subsequent data analyses resulted in a revised version of this instrument omitting 2 scales (social structure and climate; peers in school) and several items. The final form of the SSI consisted of 54 items, 47 of which were used. Students received one overall mean score on the SSI, representing a general attitude towards school. This score was based on the item total divided by the number of responses, thus insuring comparability among students whether or not they had responded to all items. Mean scores ranged from 0 to 1, with 1 representing a more positive attitude towards school.

Reliability data is reported by the Instructional Objectives Exchange (1972) for a single total score. Internal consistency reliability (KR-20) is given as 0.72 (N=108), and test-retest reliability, based on a time lapse of

2 weeks, is 0.87 (N=151). Internal consistency reliability (Cronbach's alpha) for the particular instrument used in this study is 0.92 for the pretest and 0.94 for the posttest (N=1259).

Piers-Harris Children's Self-Concept Scale (P-H)

The Piers-Harris Children's Self-Concept Scale (P-H) is an instrument used to assess children's self-esteem. It was developed by E.V. Piers (1967) and E.D. Harris and consists of 80 descriptive statements in a true-false format. While the Piers-Harris may be scored on several subscales, a total score was used in this study.

A number of reliability coefficients are reported for this test, based on samples of boys and girls in the third, sixth, and tenth grades (Piers, 1969). Internal consistency coefficients derived from the Kuder-Richardson Formula 21 range from 0.78 to 0.93. Based on Spearman-Brown's odd-even formula, they range from 0.87 to 0.90. Test-retest reliability ranges from 0.71 to 0.77 for a time lag of 4 months. Internal consistency reliability (Cronbach's alpha) based on this study is 0.93 for both the pretest and posttest (N=1452).

The analysis of these six instruments was carried out in two parts. In the first part, the pretest scores on each instrument were correlated with one other. In addition, the effects on each pretest instrument of ethnicity and SES were calculated by the following linear model:

1) $$Y = a_0U + a_1E^{(b)} + a_2E^{(c)} + a_3SES^{(L)} + a_4 SES^{(M)} + a_5E^{(b)}SES^{(L)} + a_4E^{(c)}SES^{(L)} + a_5E^{(b)}SES^{(M)} + a_6E^{(c)}SES^{(M)}$$

Y = pretest

U = unit vector

$E^{(b)}$ = ethnic group membership (1=Black, 0=Anglo or Chicano)

$E^{(c)}$ = ethnic group membership (1=Chicano, 0=Anglo or Black)

a_0 in both $E^{(b)}$ and $E^{(c)}$ = Anglo

$SES^{(L)}$ = SES level (linear prediction)
$SES^{(M)}$ = SES missing data
1=data present, 0 = data missing
$E^{(b)}SES^{(L)} - E^{(c)}SES^{(M)}$ = ethnicity by SES interaction

By dropping the appropriate vectors from the model, three types of tests were made. First, the interaction effects were tested by dropping the $E^{(b)}SES$ and $E^{(c)}SES$ vectors, creating a new model:

2) $\text{Pretest} = a_0U + a_1E^{(b)} + a_2E^{(c)} + a_3SES^{(L)} + a_4SES^{(M)}$

Next, ethnicity and SES were each tested, partialling the other by dropping one or the other of them from model 2. This creates two new models:

3) $\text{Pretest} = a_0U + a_1E^{(b)} + a_2E^{(c)}$ and

4) $\text{Pretest} = a_0U + a_3SES^{(L)} + a_4SES^{(M)}$

Finally, the unpartialled effects of ethnicity and SES were tested by dropping ethnicity from model (3) or SES from model (4).

The second part of the analysis involved looking at change on each of the six measures predicted by initial level on the other five instruments. The starting model for these analyses follows:

1) $Y = a_0U + a_1X^{(L)} + a_2X^{(M)} + a_3P^{(L)} + a_4P^{(Q)} + a_5P^{(M)}$

Y = posttest
U = unit vector
$X^{(L)}$ = pretest score
$X^{(M)}$ = pretest missing (1=pretest score present; 0=pretest score not available)
$P^{(L)}$ = other instrument score
$P^{(Q)}$ = quadratic prediction ($P^{(L)}$ squared)
$P^{(M)}$ = missing data on other instrument

The effect of the "other instrument" predictor on regressed change was tested by dropping the three pupil vectors from the model. The relative contribution of each of the three components (linear, quadratic, and missing data)

was also estimated by dropping the appropriate vectors from the model.

Results and Discussion

Table I shows the relationship among the six variables at the beginning of the year. Taking a correlation of .1 (1% of the variance) as a cut-off point, the table shows that all variables except CTBS were significantly related to each other (a correlation of .05 is approximately significant at the .01 level). CTBS was related only to the P-H self-esteem measure. Since these relationships were all positive, it can be said that, in general, pupils high on Attitude variables were also high on Coping and Self-Esteem variables and vice versa. The positive relationship between P-H and CTBS confirms the findings of other studies that were mentioned in the introduction. The lack of relationship between initial levels of achievement and the attitude and coping measures is important, because it means that at the first of the year, pupils of differing achievement levels started out the year equated in attitude.

In analyzing the pretest differences among pupils of differing ethnic and SES background, two instruments showed effects. P-H pretest score varied linearly as a function of SES (partialling ethnicity) [$F(2,1189) = 16.82$, $P < .01$, % var. = 2.73]. The higher the pupils' socio-economic status, the higher the pupils' self-esteem. It should be noted that while P-H was related to the other measures, SES was related only to P-H and CTBS achievement. SES (partialling ethnicity) did have a significant effect on CTBS [$F(2,1180) = 36.66$, $p < .01$, % var. = 11.17]. The whole ethnicity effect predicted 19.9 percent of the pretest variance. As with self-esteem, P-H, CTBS scores were higher for pupils of higher SES. Anglo students had significantly higher pretest scores than Blacks [$F(1,1182) = 240.31$, $p < .01$, % var. = 16.28] and Chicanos [$F(1,1182) = 99.94$, $p < .01$, % var. = 1.50]. The combined ethnicity

and SES variables predicted 24.8% of the CTBS pre-variance. This clearly shows that low SES and minority pupils started out at a disadvantage in the Austin sample both in achievement and, to a lesser extent, in self-esteem. None of the other instruments differed by ethnicity or SES, so it can be assumed that these groups of pupils started out about equal in attitude and self-reported coping skill.

Change. The following results are reported in terms of regressed change. All of the relationships were generally linear in shape and positive in direction. This means that a higher score on a predictor was correlated with a higher degree of gain, relative to the difference between the mean pretest and the mean posttest. For example, on some instruments such as SET, there was a slight overall drop in mean score from the pre to posttest. For students with high SSC-A scores, there was less loss on SET than students with low SSC-A scores. Table II shows the mean pretest, posttest, and pre-post differences for each of the six instruments. The pre-post correlation for each instrument is also shown.

The analytical model discussed earlier was applied to each of the six variables. The .01 level of significance and 1% of the change variance were taken as joint criteria for counting a relationship as significant. Percent-of-change variance was found by dividing the percent of posttest variance predicted by $1-R^2_{xy}$, where R^2_{xy} is the pre-post correlation. Tables II through VII show the significant results, instrument and instrument. Nearly all of these effects were linear and in a positive direction. The percent-of-variance numbers in the table represent the linear prediction, unless otherwise specified. There were three effects where substantial prediction from the quadratic component was found. Figures 1 through 3 graph these relationships.

Change on the three attitude measures (SET, SSC-A, and SSI) was significantly predicted by all of the other measures, with the single exception that SET change was not significantly predicted by CTBS pre. One other complication was that P-H pre had a quadratic component in its relationship to SET change. Figure 1 shows that pupils with low P-H scores (more than 1 SD below the mean) showed very little relationship to SET change, whereas higher P-H scores had a positive, linear relationship with SET change. Several related conclusions can be drawn from these findings. Pupils with good attitudes at the beginning of the year are likely to have even better attitudes at the end of the year; or, as with SET change, they show less loss in attitudes towards their teacher. Also, pupils who measure high on initial coping and self-esteem show a similar pattern of greater gains in attitude. Finally, pupils with high initial levels in achievement gain in their attitudes during the year, except for their attitude towards their own teacher. The widening of the gap phenomenon observed for achievement in other studies seems to hold for attitudes also, at least over the course of a single year. The fact that CTBS-pre was related to change in SSC-A and SSI, but was not correlated with the pretests of these instruments implies that differences in attitude due to achievement may recover between school years. However, this statement assumes that the same processes observed in this sample went on during the previous year. Change on the coping measure used in the analysis was also predicted by all of the other pretests, indicating that coping skill follows the same pattern of relationship as the attitude measures.

Self-esteem change, as measured by P-H, showed a slightly different pattern. Of the attitude measures, only SSC-A predicted P-H change even though P-H pre predicted change on all three attitude instruments. Initial attitudes toward teacher and school do not seem to influence change in self-esteem. Perhaps,

self-esteem is causally prior to attitudes toward teacher and school; that is, attitudes towards others formed in part as a result of one's own self-image, but not vice versa. More research would be needed to test this interpretation. SSC-C is also related to P-H change, indicating a reciprocal relationship between coping and self-esteem. This finding represents more evidence for a widening-of-the-gap phenomenon in areas other than achievement. CTBS-pre was the best predictor of P-H change, accounting for almost 4% of the variance, and establishing a relatively strong relationship between change in self-esteem and initial achievement level.

When achievement change was analyzed, P-H pre was the only significant predictor. Thus, achievement and self-esteem have a reciprocal relationship; students with a high initial self-esteem show greater achievement gains over the year, and pupils with high initial achievement show greater gains in self-esteem. This widening of the gap within a single school year reinforces the cross-sectional evidence discussed earlier. Equal to the importance of the self-esteem/achievement relationship is the lack of any other relationship, implying that good attitudes and self-reported coping skills do not result in achievement gains, although high achievers do show positive change in attitude and coping skills.

SES and ethnicity variables are also involved in this pattern, since the analysis of pre-test data showed that there were large differences in achievement pretests for pupils of different ethnic and socio-economic backgrounds. Also, there were differences in initial self-esteem due to SES. If the reciprocal relationships between self-esteem and achievement are true, then low SES and minority children are caught in a vicious circle, just as Stearns (1971) suggested.

In summary, pupils in this sample began the school year with varying degrees of attitude, self-esteem, and achievement. Pupils with good attitudes in one

area were likely to have good attitudes in other areas. They also had higher self-esteem and coping skills; however, they did not have different achievement levels. Students with high self-esteem did have higher achievement scores, and vice versa. Finally, disadvantaged students who were low SES, or from minority backgrounds, tended to have much lower achievement scores and somewhat lower self-esteem scores.

Over the course of the year, the pupils who had the highest initial achievement and students with the highest self-esteem were more likely to gain in attitude, relative to students lower in initial achievement and self-esteem. There is some indication that this change may be specific to the school year and not carry over to the next.

Students high in initial self-esteem gained in achievement over the school year and students high in achievement gained in self-esteem. This pattern does appear to carry over, since these two measures were related at the beginning of the year.

Disadvantaged students are locked into the negative end of this cycle since they start out the year at the lower end of both self-esteem and achievement. Stearns (1971) reported that even disadvantaged children who had participated in head start programs to improve their initial achievement levels, end up at the losing end of the cycle. One possible reason for this is clearly suggested by these analyses. The results suggest that <u>both</u> achievement and self-esteem must be improved before the widening of the gap can be reversed.

TABLE I

Correlation Matrix for Pretests on all Instruments

	SET	SSC-A	SSC-C	P-H	CTBS	SSI
SET	1.00					
SSC-A	.22	1.00				
SSC-C	.19	.53	1.00			
P-H	.18	.38	.36	1.00		
CTBS	-.01	.07	.07	.26	1.00	
SSI	.45	.54	.45	.39	.09	1.00

TABLE II

Instrument	Pretest Mean	Pretest SD	Posttest Mean	Posttest SD	Difference	Correlation
SET	2.96	.59	2.79	.65	-.17	.47
SSC-A	26.13	3.59	25.73	3.66	-.40	.53
SSC-C	33.85	4.81	33.49	5.38	-.36	.55
P-H	71.03	16.39	71.74	16.66	+.71	.68
CTBS	491.21	85.18	488.76	92.27	-2.45	.74
SSI	.71	.19	.76	.24	+.05	.55

TABLE III

STUDENT EVALUATION OF TEACHER(GAIN)

Predictor	F-test	Percent of Variance
SSC-A	F(3,1343)=10.14	2.19
SSC-C	F(3,1343)=5.55	1.15
P-H	F(3,1343)=7.74	1.70*
SSI	F(3,1343)=6.86	3.61

TABLE IV

STUDENT SENTENCE COMPLETION (ATTITUDE) (GAIN)

Predictor	F-test	Percent of Variance
SET	F(3,1410)=8.20	1.66
SSC-C	F(3,1410)=6.56	1.37
P-H	F(3,1410)=15.97	3.04
CTBS	F(3,1410)=9.07	1.63
SSI	F(3,1410)=17.25	3.10

*includes quadratic and missing data predictors

TABLE V

STUDENT SENTENCE COMPLETION (COPING) (GAIN)

Predictor	F-test	Percent of Variance
SET	F(3,1410) = 7.28	1.45
SSC-A	F(3,1410) = 9.90	1.95
P-H	F(3.1410) =25.96	2.73
CTBS	F(3,1410) =12.52	2.40
SSI	F(3,1410) =22.33	4.28

TABLE VI

PIERS-HARRIS (GAIN)

Predictor	F-test	Percent of Variance
SSC-A	F(3,1188)= 5.45	1.36*
SSC-C	F(3,1188) = 5.51	1.37*
CTBS	F(3,1188) =17.58	3.77

*includes quadratic and missing data components

TABLE VII

COMPREHENSIVE TEST OF BASIC SKILLS
(GAIN)

Predictor	F-test	Percent of Variance
P-H	F(3,1179) = 5.21	1.26

TABLE VIII

SCHOOL SENTIMENT INDEX
(GAIN)

Predictor	F-test	Percent of Variance
SET	F(3,1391) =23.37	4.31
SSC-A	F(3,1391) = 7.93	1.66
SSC-C	F(3,1391) = 5.25	1.05
P-H	F(3,1391) =11.63	2.18
CTBS	F(3,1391) = 9.40	1.88

FIGURE 1

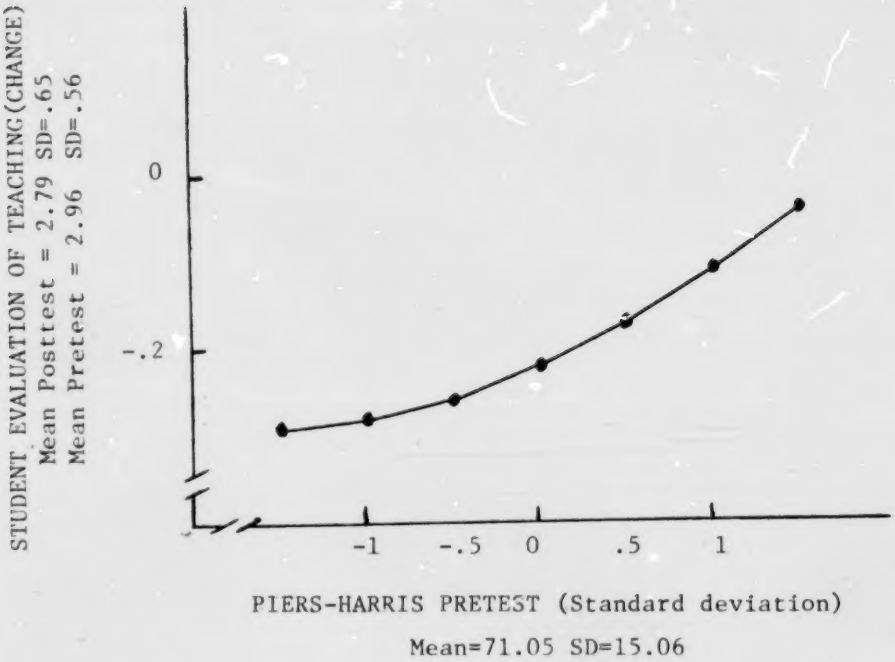

STUDENT EVALUATION OF TEACHING (CHANGE)
Mean Posttest = 2.79 SD=.65
Mean Pretest = 2.96 SD=.56
0
-.2
-1
-.5
0
.5
1
PIERS-HARRIS PRETEST (Standard deviation)
Mean=71.05 SD=15.06

FIGURE II

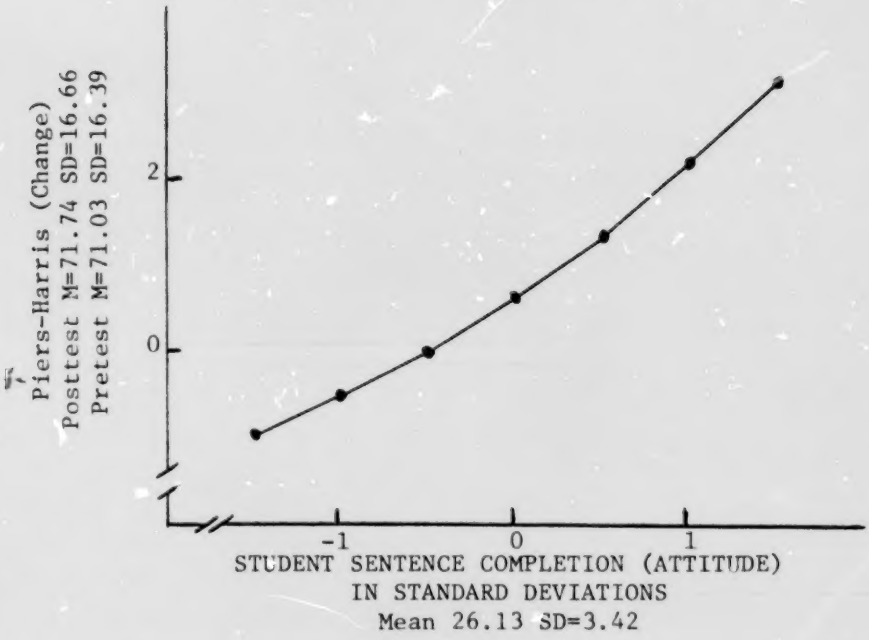
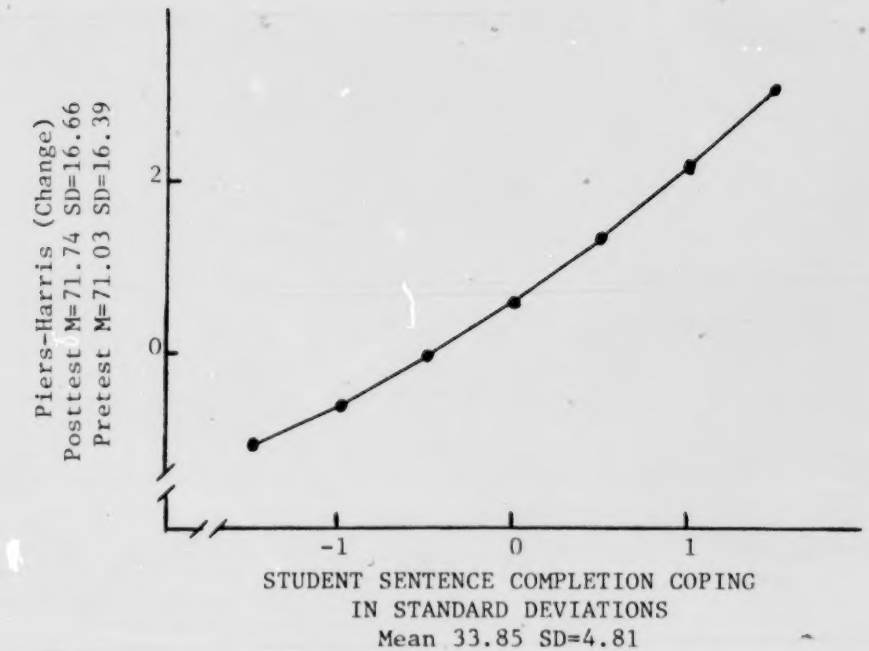


FIGURE III



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